REMARKS

Claims 1-31 are all the claims pending in the application.

The Specification has been objected to by the Examiner.

Claim 15, 17 and 13 has been objected to.

Claims 1, 26-28 have been rejected under 35 U.S.C. § 112, second paragraph.

Claims 1-14, 16, 17, 21-23 and 26-31 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rhoads-1996 (US 6,122,403) and Rhoads-2000 (US 6,424,735).

Claims 15, 18-20, 24 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rhoads-1996, Rhoads-2000 in view of Koopman (US 5,363,448).

The Applicants traverse the rejections and request reconsideration.

Objections to the Specification and Claims, section 112 Rejections

The Applicants respectfully amend the Specification and the claims to overcome the objections and the rejections under section 112, second paragraph.

Prior art rejections

The claims have been primarily rejected based on Rhoads-1996 and Rhoads-2000.

Rhoads' 1996 describes a set of algorithms which deal with an absolutely different problem than the present invention. Rhoads' algorithms try to embed a short set of data in a digital signal. The type of processes described in Rhoads' are closer to Steganography than to Cryptology. The present invention, on the other hand, deals with Digital Graphic Automata Processing and Cryptology in a very pure fashion. Graphic Automata Processes are used to generate complex graphic output, with few parameters involved, while Cryptographic processes encrypt any set of data of any longitude, transforming and translocating the set of data itself, in a

way that could be easily inverted by someone who knows a short value used as a key, but impossible to invert for someone who didn't know that key.

Rhoads' teaches a method for protecting originals (images, sound records, music...) from being copied without paying royalties to the true owner of the source. The present invention provides methods for transforming important data so that anyone could read it without having the key used for doing the mentioned transformation.

Rhoads' algorithm basically implies the following steps:

1- Arbitrary choosing an N-Bit value that calls "Identification Word". With N bits, ordered from 1 to N.

2- Generating a set of N noisy signals (sets of data of the same type than the original being protected). Also ordered from 1 to N.

3- Multiplying every N-noisy signal by its corresponding bit of the N-Bit value. So, where N-bit=1, the corresponding N-noisy signal remains equal; where N-bit=0, the corresponding N-noisy signal becomes a null signal.

4- Calculating a Final Noisy Signal, by adding every signal in the resulting set of N-noisy signals.

5- Adding this Final Noisy Signal to the original signal being protected.

If the set of Noisy Signals used are correctly scaled according to the original signal, it is possible to detect the presence or not of the Final Noisy Signal in any reproduction of the protected material, demonstrating that the reproduction is copied from the original released by the true owner of the material (as the original is never released without adding it to the Final

noisy Signal, and is stored in a secure place by the true owner). For instance, by using this method, a photographer can demonstrate if a picture in a magazine has been copied from an original of his own or not. Although the most obvious way of application of the method is with images and pictures, the same proceedings are applicable to any kind of digitalized signal, like sound records, recorded music, or whatever you can digitalize.

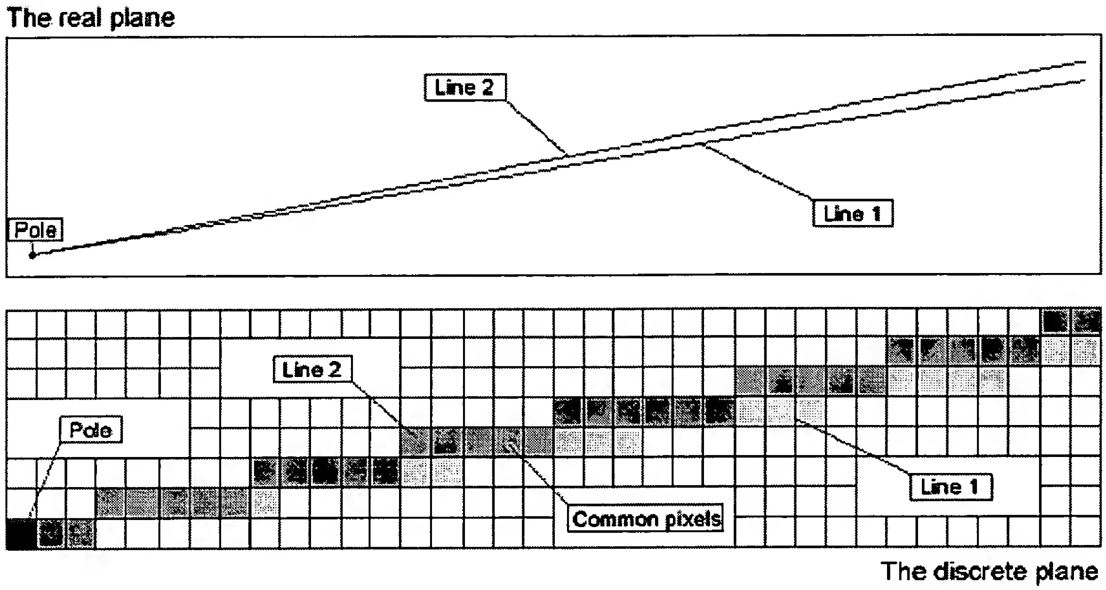
Given an array distribution, the present invention chooses a pole, and plots a set of digital lines from this pole and repeats the process for every cell belonging to the array contour. Each time it draws a cell, it performs an operation (for example, a digital Xor operation with a logic "1" and the value of the pixel). This procedure yields high complex outputs and has the property of being an involution, due to the Xor operation. Independent claims 1, 26, 27 and 28 cover bi-dimensional, three dimensional and unidimensional vector spaces.

As can be seen, the present invention and Rhoads are completely different.

Further, Rhoads' superimposes a noisy image (or signal), with the original one, providing copyright protection. On the other hand, the present invention is not superimposing but directly drawing over the digital data, and providing information security over any unsecured channel or storing media. It can not be considered as a superimposing method, since there is more than one line of the set of digital lines defined by a contour and a pole, passing through the same point/pixel. So each and every pixel suffers a different number of transformations, depending on its relative position to the rest of the graphic. It is well known that in a superimposing method (as the one described in Rhoads'), the combination is yielded pixel by pixel; and this is not valid at all for the present invention.

Techniques of the present invention could not be interpreted as superimposing algorithms, since the drawing process yields a different number of transformations in each an every pixel of the array, depending on its relative position to the rest of the elements of the graphic structure defined (the pole, the contour...). So, the result is absolutely different to the one yielded by a pixel by pixel superimposing method, like the methods presented in Rhoads'.

This special feature is obtained by the different behavior of the real plane and the discrete plane: In the former, no different line segment could share more than one point with another line segment, unless it is the same segment; but in the latter, two nearby segments share a lot of points/pixels, because of its discrete behavior (see Figure below); and this is one of the principal advantages of the present invention for yielding high complexity outputs, with few parameters involved. The present invention should never be interpreted as superimposing two images, but transforming one image into another one, by a simple method that yields high complexity. Thereby, this is a basic difference that makes the present invention completely different from Rhoads.



In addition, what Rhoads' superimpose is a scaled noisy signal, so that it does not change the original signal quality in a noticeable factor, while the present invention combines two signals yielding an output signal, that could never be even identified as similar to the original. Further, Rhoads' combines the original signal with an scaled noisy signal, because it do not want the original image to lose a certain amount of quality, and Rhoads' methods lost any sense if they are applied with not scaled noisy images, as it would make the result absolutely noisy, and therefore, without its commercial value. The present invention does not scale them in any form, because what it searches is to make the original data literally disappear in the reversible noisy data.

Further, the concept of "reversible noisy data" is believed to be valuable, as Rhoads' noisy signals are only reversible if they are saved, while the noisy images of the present invention are reversible having only the parameters used to generate them.

Still further the present invention uses translocation. Any Cryptographic expert knows that a good symmetric encryption algorithm should be composed of two mechanism, one for what it is called "Substitution" and another one for "Translocation". Translocation refers to the process of "disordering" the plain data in its encrypted form, to ensure no controlled modification of the encrypted data could be taken over. It is also mentioned in Page 13, Lines 17-33., of 09/781.304 Application. Rhoads does not use translocation in the same way as the present invention, because it is not doing Cryptography, but Steganography; so he has no need of pseudorandom translocation as in the present invention; the only translocation used by Rhoads', are rotations, or global translations, or coordinate system changes... to achieve detection of watermarks, but no pseudo random translocation is applied over Rhoads'.

Claims 2-25 and 31 are dependant on claim 1 and are allowable at least for the same reasons. Claims 29-30 are dependant on claims 26 and 27, respectively and are allowable at least for the same reasons.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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